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Australasian Plant Conservation

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The Southeast Queensland Fire and Biodiversity Consortium
Regional Vegetation Planning
Translocation Workshop

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Front cover: Volunteers from Conservation Volunteers Australia monitor the Three Springs Daviesia (*Daviesia bursarioides*) translocation site (WA) Photo: Leonie Monks. **Back cover (from top to bottom):** (a) Volunteer Marianne Hasson plants Phalanx Grevillea (*Grevillea dryandroides* subsp. *dryandroides*) near Wongan Hills (WA). Photo: Leonie Monks; (b) A juvenile *Allocasuarina portuensis* translocated into Sydney Harbour National Park (NSW). Photo: Paul Ibbetson; (c) Emma Watt & Chris Todd planting *Epacris stuartii* on Southport Island (Tas). Photo: Paul Black; (d) Translocated *Acacia pubescens* at Rookwood Cemetery, Auburn (NSW). Photo: Judith Rawling.; (e) CALM staff and volunteers help plant five critically endangered plant species near Busselton, Western Australia. Photo: Leonie Monks. **Cover design:** Siobhan Duffy, CSIRO Plant Industry.

President's report

Judy West
Centre for Plant Biodiversity Research
CSIRO Plant Industry

The ANPC Inc. held its Annual General Meeting in Canberra on the 21st of November 2003. An election was held and we now have a new look Committee. As the incoming president I would like to acknowledge the efforts of the past Committee and particularly those who contributed enormously to keeping the organisation viable in difficult times. I greatly appreciate their efforts, not least because we have an inspirational approach to some new tasks.

I feel privileged and rather apprehensive in taking on the position as President of the ANPC. It is an organisation that has a substantial role in Australia and has already influenced plant biodiversity conservation significantly, and yet ANPC currently has some difficulty in finding that real space in which to work. This is part of the challenge that the incoming committee will be addressing. In addition, major efforts will be undertaken to secure infrastructure funding to underpin and complement the considerable project support obtained in the past couple of years. We will also be trying to widen the geographical scope of our project funding applications and the resulting activities.

New President Dr Judy West.
Photo Murray Fagg

The recently elected committee has several new members who bring a different set of skills to the table. Diversity of our officers and a variety of experiences and geographical representation enables us to address a broader range of ANPC's remit and to reach a wider stakeholder group. There are many challenges to keep us at the forefront of biodiversity conservation and I feel confident that we have an outstanding team who will work well together for the benefit of the ANPC.

The Southeast Queensland Fire and Biodiversity Consortium: a case study in interagency cooperation and community education

Penny Watson and Cuong Tran
SEQ Fire and Biodiversity Consortium

Paul Donatiu
World Wide Fund for Nature
Steering Committee Member, SEQFABC

Southeast Queensland stretches from Noosa at the top of the Sunshine Coast in the north, to the New South Wales border in the south. The Great Dividing Range forms the western boundary; while to the east lie the islands of Moreton Bay and the South Pacific Ocean. Over two million people live in this area, which includes the cities of Brisbane and the Gold Coast, as well as numerous smaller urban and rural centres.

Although clearing for urban development and agriculture has taken its toll, the area still supports considerable native vegetation. Southeast Queensland bushland includes a wide diversity of community types, from rainforest to heath to grassy woodlands. Animal and plant species diversity is high. While the area includes national parks and other reserves, much of the remaining bushland is on freehold land. Needless-to-say, fragmentation is a major issue.

Eighteen local councils provide the third tier of government in Southeast Queensland. Some are primarily urban, others substantially rural. Almost all, however, are concerned with bushland fire management. In many cases this concern has sprung from the realisation that land acquired for conservation purposes through levy schemes brings considerable on-going responsibilities. The need to consider fire hazard factors in development planning is a second factor in local authority interest. In addition, local government-based schemes which encourage nature conservation on private property, such as Land for Wildlife and Voluntary Conservation Agreements, have alerted staff to the need to provide landholders with guidance and support in managing fire.

The Southeast Queensland Fire and Biodiversity Consortium (SEQFABC), or the Consortium was formed primarily from these local government concerns. In 1998 a core group called together the first meeting of the Consortium. Representation was invited from all SEQ councils, as well as from key state government agencies: the Rural Fire Service, the Queensland Parks and Wildlife Service, the Department of Natural Resources and Mines, and the Department of Primary Industry. Non-government groups and universities were also approached.

Consortium aims and structure

Five years later, the Consortium is alive and well, with approximately 40 core members covering the agencies and groups mentioned above. These people form the hub of a very broad network of land managers, fire managers, researchers, extension officers, policy developers and planners with an interest in the role of fire in biodiversity conservation. The Consortium brings together people from diverse backgrounds and provides a forum for networking, a nexus for information exchange and opportunities for increased understanding of the diverse viewpoints and skills that necessarily form part of managing fire.

The Consortium's aim is to gather and disseminate information on fire management practices that will support conservation of Southeast Queensland's biological diversity. Although its initial work was unfunded, funding through the Commonwealth Government's Bushcare Program was granted in early 2000, enabling the group to employ a full-time coordinator from March 2000 to February 2002. Funding was used to produce and disseminate a range of products to assist land managers and those who support them to access the knowledge contained in the literature and in the minds of those who have worked with fire for many years. The next phase, through a partnership with Griffith University, will continue this information dissemination role, but also facilitate and conduct fire research, attempting to answer the many questions about fire regimes and ecosystem functioning.

Consortium outputs

Table 1 summarises the materials produced by the Consortium, which are all currently available. Some of the materials, which have been overwhelmingly well received and used, include:

Table 1. Southeast Queensland fire and biodiversity consortium outputs.

PRODUCT NAME	DESCRIPTION OF PRODUCT
"Fire & Nature Conservation in SEQ: an introduction" – Level One Fact Sheet	Four page introductory fact sheet for the public including land holders
"Fire in Bushland Conservation" – Level Two Fact Sheet / Booklet	In depth (20 pages) brochure on the ecological role of fire and management implications for landholders
"Fire as a Wildlife Habitat Management Tool"	Produced in conjunction with Land for Wildlife officers for landholders
Presenters Database	Excel Database of people attending 'Presenters Workshop' in August 2001 and list of Experts with contact details to help with future Fire Management Planning Workshops
Demonstration Sites Database	Excel Database of sites in the southeast Queensland region with well-known fire history data with contact details to access sites.
List of Potential Fire Ecology Research Projects	Comprehensive list of projects and contacts with interests in supervising and providing support for higher degree (Hons/Masters/PhD) studies
Comprehensive Literature Review	Targets professionals who want an in depth understanding of current fire ecology literature
Ecological Guidelines	For professionals wanting an easy-to-follow summary of the management implications of the fire ecology literature, with recommended fire frequencies for different vegetation ecosystems
Individual Property Fire Management Planning Kit	Assists landholders to plan fire management on their property, providing a balanced approach to protection and conserving biodiversity
Operational Level of Fire Management Manual	Targeted to private landowners wishing to conduct planned burns for hazard reduction and/or ecological purposes
Strategic Level of Fire Management Manual	Primarily targeted to local authorities responsible for fire management practices, including planning and development and infrastructure requirements
Monitoring Manual	Targeted at local government officers and staff with methods specifically tailored for monitoring bushland prior to, during or after fires (planned or bushfire).

Ecological Guidelines

This document is a synthesis of the information in the literature, converting it into a series of "ecological guidelines" to assist SEQ native vegetation managers as they plan fire management in their bushland. The guidelines provide "best estimate" recommendations for ecologically sustainable fire regimes for broad vegetation types (wet sclerophyll forests, dry sclerophyll forests and woodlands with a shrubby understorey, dry sclerophyll forests and woodlands with a grassy understorey, coastal heath, heaths of rocky areas, *Melaleuca quinquenervia* wetlands).

Fire Management Workshops incorporating the Individual Property Fire Management Planning Kit and presentations on Fire Ecology

Several products are targeted to a less professional audience. These include a 30-minute presentation on fire ecology and its implications for management, using images of plants and animals to explain the role of fire in the bush. The presentation describes the responses of plants and animals to fire, then uses this information in discussing key points about fire management in relation to four fire regime elements: frequency, extent/patchiness, intensity and season. The Consortium has implemented a train-the-trainer session, transferring the presentation role from the project coordinator to other Consortium and network members, particularly extension staff. This has led to an increased use of the *Individual Property Fire Management Planning Kit* and the workshops throughout the region, far beyond the capacities for one project coordinator to perform this valuable task.The *Individual Property Fire Management Planning Kit* takes a more holistic view of fire management, with an emphasis on balancing property protection with conservation. Its target is private landholders, although it may also assist those responsible for small public natural areas. The kit provides a step by step process for preparing a basic fire management plan (maps, proformas etc.). Landowners are encouraged to return a copy to the Rural Fire Service district office. The Queensland Fire and Rescue Service are now in the process of including the kit on their mapping system which will greatly assist the fire fighters with information on landholder assets and resources in the event of a wildfire, or to assist in conducting burns on the property.

Educational Fact sheets and booklets

Early in the project the coordinator worked with local Land for Wildlife officers to develop a Technical Note on *Fire as a Wildlife Habitat Management Tool*. As one of a series of Land for Wildlife Tech Notes, this document has had a wide circulation amongst conservation-minded private landholders throughout SEQ. The Consortium also plans to produce two fact sheets for private landholders. The first introductory fact sheet is fairly basic, aimed at a wide audience including people who know very little about the role of fire in the bush. The second booklet is targeted to landholders with a relatively deep interest in fire ecology and bushland management, and covers similar ground to the information provided in the presentations and workshops. These have been very widely used and made available throughout the region.

Fire Monitoring Manual

The Consortium recognised that a method was needed to maintain consistency across the region when conservation officers and other staff collected data on the effects of fire. To date, the lack of consistency in the data prevented its use by other institutions and agencies. The Fire Monitoring Manual, produced with the assistance of Greening Australia (Qld) provides a wealth of monitoring procedures to measure the effects of fire within conservation areas and other reserves. Other important information covered includes establishing and maintaining plots, uses and limitations of each monitoring method and appropriate data analysis.

These materials can be downloaded from http://www.gu.edu.au/text/school/asc/fire2/frmaeprod.html

Key messages

Fire management is complex, and options often limited, particularly for private landholders in a fragmented, multi-

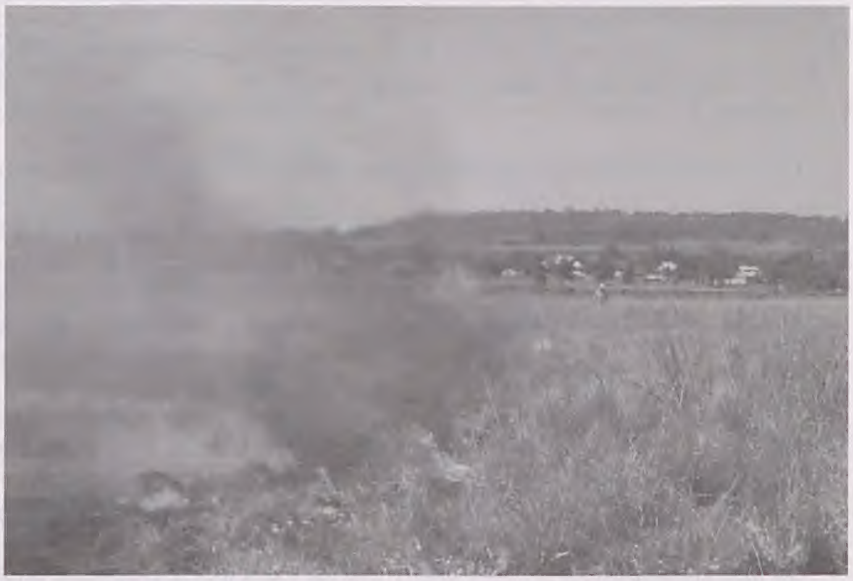

Figure 1. A fire in a grassland on the Darling Downs near Toowoomba. These grasslands are a threatened regional ecosystem and contain many rare plant species. Photo Paul Donatiu

use landscape. The Consortium hopes to convey a few key points, which landholders and managers can keep in mind as they negotiate the complications of the real world. These messages include:

That fire plays a vital role in renewing many SEQ ecosystems. One end of the spectrum in SEQ and other areas involves a belief that fire is undesirable, no matter what the context. The Consortium strives to help people appreciate the role of fire in the bush, and encourage them to value it as an integral part of fire-adapted ecosystems.

That **both too frequent, and too infrequent, burning can cause species to become locally extinct.** This is a clear message from the literature.

Different vegetation types are adapted to different fire frequencies. Recommendations in the Ecological Guidelines suggested fire frequencies ranging from 2–6 years for grassy woodlands, to 15–40 years for wet sclerophyll forests.

That **variability in the intervals between fires is important.** Even within a single community, some plant species benefit from relatively frequent fire, while others are more abundant where fire has been less.

That **a mosaic of vegetation in different stages of post-fire development will help provide habitat for a range of fauna species**. Consortium products outline the stages vegetation goes through as it regenerates after fire, and the preferences of different fauna species for habitats of differing complexity.

That **fire should be considered in a landscape context.** Vegetation communities in SEQ often form a mosaic, with different elements of the landscape adapted to different fire frequencies. Rare species may occur in landscape features that have historically experienced a lower fire frequency than the surrounding matrix, such as rocky outcrops and damp gullies. Fire managers need to consider how to ensure appropriate fire frequencies in communities, which need relatively frequent fire, and in nearby refuge–habitats where fire may be better excluded, or relatively rare.

That **there are ways to minimise risk to both life and property, and biodiversity.** The Individual Property Fire Management Planning Kit uses the concept of zoning. Life and property protection comes first, but if this is well done in and around the home, then nearby bushland can more confidently be managed through fire regimes appropriate for biodiversity conservation – which generally involve longer inter-fire intervals than those appropriate for property protection purposes.

Encouraging and Facilitating research

The project also hopes to generate interest in scientific research projects that will help fill gaps in the understanding of the fire ecology of SEQ ecosystems. While some local studies have been conducted, there are many outstanding questions. Wet sclerophyll forests pose a particular puzzle, and have been identified as the priority research area in the region. In addition, although informed guesses can be made in relation to dry sclerophyll forests and woodlands, there is very little local research to substantiate these. This element of the project has brought together university and agency researchers, and land managers with an interest in fire ecology, through a workshop and a series of follow-up meetings discussing research possibilities for each broad vegetation type. Involvement with new initiatives, such as the recently approved Bushfire Cooperative Research Centre and the possibility for increased national use of Consortium products presents an exciting new chapter for the Project.

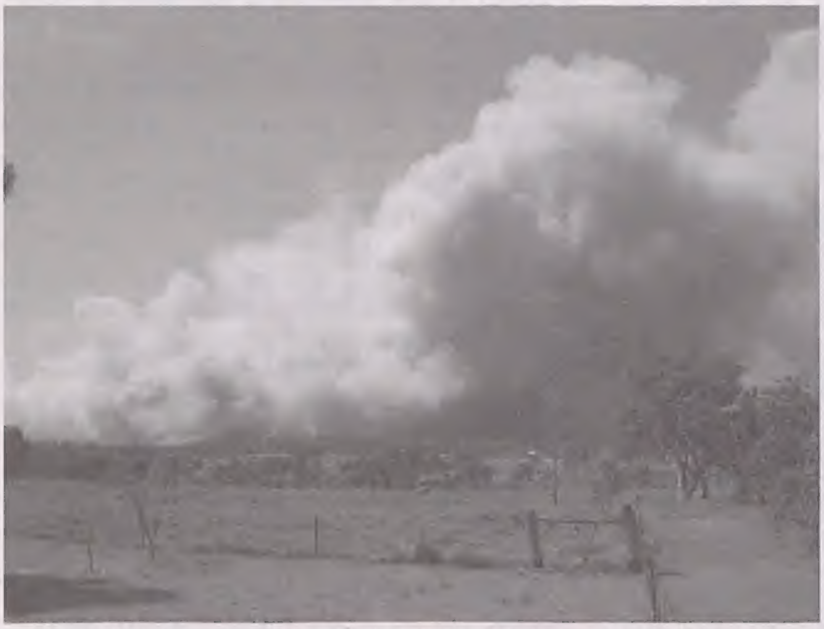

Figure 2. A fire at Stanthorpe (October 2002) which destroyed half of Girraween National Park. Photo Paul Donatiu

Factors in the project's success

The cross-disciplinary nature of the Consortium is undoubtedly a major strength, giving us ready access to a wide range of expertise. The mix of local and state government agencies and community groups ensures approaches to fire management acknowledge the needs of all stakeholders. The project also benefits from the existence and nature of local networks, and shows signs of extending out further beyond the SEQ bounds.

These networks have allowed the Consortium to concentrate on resourcing those already working with landholders, rather than trying to reach individual landholders directly. Initiatives such as Landcare, catchment coordination, Bushcare and Land for Wildlife have been instrumental in developing networks and encouraging ethics which encompass cooperation, openness to information, and respect for the bush and its inhabitants.

So far, the project's work has been remarkably unhampered by political considerations. Indeed, some benefit may have been gained from the fact that in Queensland cross-agency cooperation with respect to local fire management planning is not mandated by legislation. Similarly, landholders may be encouraged to consider how best to manage their bushland for fire, but are not required to adopt a particular course (other than ensuring they have a valid permit).

Conclusion

The SEQ Fire and Biodiversity project is supporting landholders, those who work with them, and the wider community to develop the knowledge and attitudes needed to implement and support appropriate fire management for biodiversity conservation. It is a first step in a long and complex journey, which may need to include more directive strategies in years to come. The Consortium believes that the cooperative educational initiatives will always have a role in translating research findings into a form that land managers can apply, and in encouraging the dialogue that is essential in fire management.

Room for Discovery: Do we know enough about Australia's gypsophiles?

Marion O'Keefe
School of Science and Engineering
University of Ballarat

The gypsum outcrops of Australia's semi-arid and arid zone provide a fascinating opportunity to study a poorly known component of Australia's flora, the gypsophiles. In a review of gypsophilous species worldwide Parsons (1976) highlighted the paucity of information on gypsophiles in Australia. I aim to clarify the role that gypsum plays in semi-arid and arid SE Australia and improve our understanding of gypsophilous plant species.

Gypsophiles are plants which grow on gypsum (calcium sulphate dehydrate) and while they can be divided into three different classes (see below), they all have one thing in common, the ability to survive in extreme environments. The reputation of gypsum as a poor substrate has come about as a result of the poor floristic diversity that is often characteristic of gypsum deposits. Those plants that grow on the gypsum aren't just dealing with (potentially) toxic levels of sulphur. As these deposits occur in areas of rainfall less than 400 mm these plants have to contend with limited water, that is they are also xerophytes. As gypsum is an evaporite mineral, formed primarily through the evaporation of saline brines, they are frequently associated with saline areas (Warren 1999). So, these plants have adapted to three negative aspects of their environment, high levels of sulphur, restricted water and saline conditions. Mousli (1981) identified other characteristics of gypsum soil which may limit plant growth, particularly (I) the high solubility of gypsum resulting in high osmotic pressure, reducing the ability of plants to extract water and (II) the formation of a pan impervious to roots and water caused through the recrystallisation of gypsum in the soil.

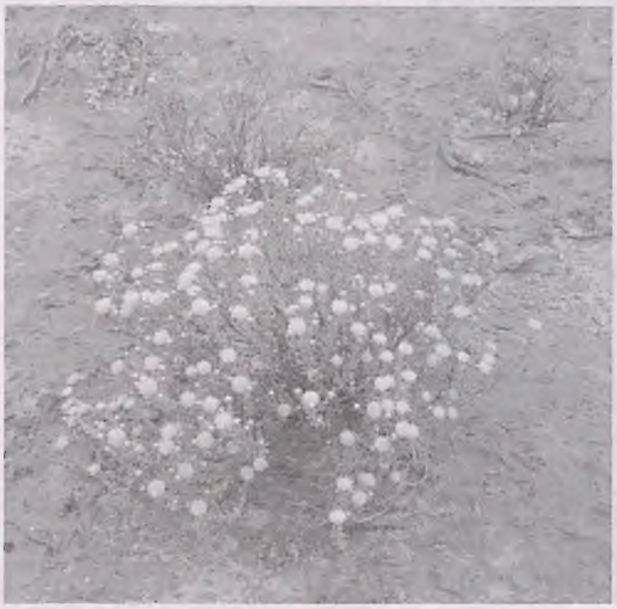

Figure 1. Kippistia suaedifolia *(fleshy minuria) growing at Nanya, Southwestern NSW. Photo Marion O'Keefe*

There appear to be three different classes of gypsophile. Firstly *obligate gypsophiles*, plants that are actually restricted to gypsum soils (e.g *Kippistia suaedifolia:* Asteraceae). Secondly *facultative* or *non-differential* gypsophiles, plants that receive some benefit from the gypsum but may grow elsewhere (e.g. *Dodonaea viscosa:* Sapindaceae). Thirdly *halophytic gypsophiles*, plants which have developed a close association with both gypsum and saline conditions (e.g *Halosarcia nitida:* Chenopodiacae).

Further than this we know little about the ecology of gypsophiles. We are not sure which of our native plants are true gypsophiles and we are not certain of the degree of gypsophily in others. How these plants became gypsophiles in the first place is another question. Was it a result of negative competition, or positive competition? Did they evolve in response to the restrictive nature of gypsum and thus evade competition from other plant species? Was there something about gypsum that made these plants unattractive to grazers? The endangered *K. suaedifolia,* noted earlier as an obligate gypsophile, does not appear to be readily grazed, if at all. Has it attained some mechanism to use the sulphur in the gypsum as a means of repelling grazing? The different forms of gypsum: massive, flour and crystal, might also influence the type of plants that occur on these outcrops. Is there a lower number of species on the massive gypsum when compared to the flour gypsum? The massive gypsum is known to create a hard crust which could act as a barrier to seeds and seedling establishment, while the flour gypsum, which is softer, may prove an easier medium for seeds to penetrate (Nettleton 1991). The purity of the gypsum deposit is yet another factor to consider. Should we expect to find a greater number of species on gypsum soil that is interspersed with other materials, which may counter effect the toxicity of the sulphur? At a mine site at Ivanhoe in south west NSW where the gypsum is exposed, there is low species diversity, while at another location, where the gypsum occurs with red sand, greater species diversity has been observed. Was the purity of the gypsum the overlaying factor here? As yet we just don't know.

While these questions are fascinating in their own respect and finding answers will significantly increase our understanding and appreciation of arid and semi-arid plant ecology, there are several practical implications to emerge from this research. Firstly, we know of several endangered plants species which occur on these outcrops and it is imperative that we understand their ecology if attempts to conserve these species are to be successful. Secondly, gypsum is currently mined for its soil amelioration properties and for use in the building industry. The rehabilitation of these mine sites is fairly haphazard, so by understanding the dynamics of gypsum plant communities, we can positively influence the direction of mine site rehabilitation. Already we have observed the phenomena of *Kippistia suaedifolia* at abandoned gypsum mine sites where they occur in their hundreds of thousands (so much for *Kippistia* being endangered!) in apparent response to the fresh gypsum laid down. The sight has a high impact when you go out expecting to search for hours for one small daisy bush and instead witness the equivalent of a yellow ocean in the middle of the arid zone - quite breathtaking.

As part of my Ph.D research I will be investigating the ecology of gypsophilous plant communities, particularly in south-east Australia (NW Victoria, Central NSW and South Australia) and would like to call on any readers to pass on any ideas or observations they have on such plants and these plant communities. For example, imagine if you have noticed *K. suaedifolia* growing where no gypsum occurs, that would end our theory of *K. suaedifolia* as an obligate gypsophile! Or do you know anyone, who, like me, is fascinated by gypsum plant communities and can exchange ideas and thoughts over the Email equivalent of a cup of coffee? If so, please don't hesitate to contact me regarding anything gypsophilous on , you never know how even an apparent small idea can lead to great discoveries.

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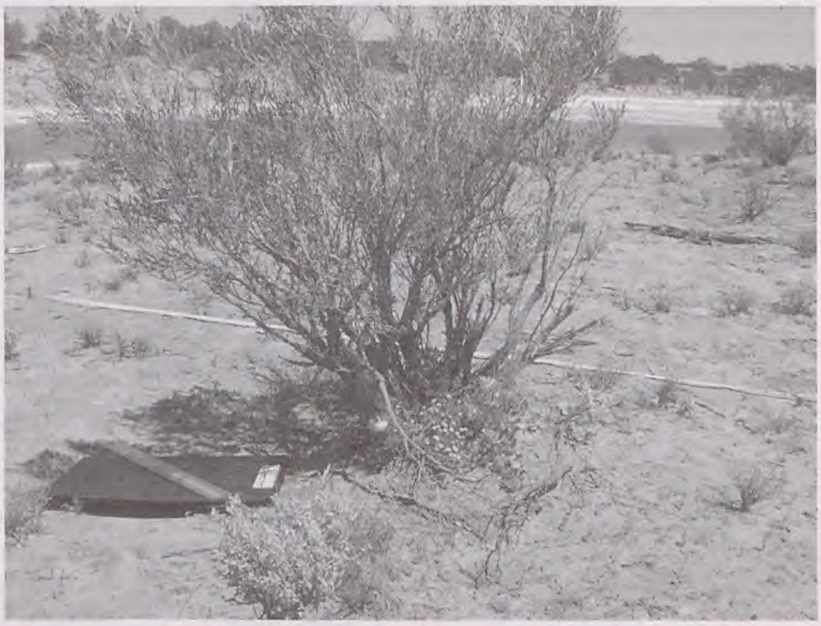

Figure 2. A Gypsum island within Nanya, Southwestern NSW. Photo Marion O'Keefe

A remnant woodland project in the Narrandera Range

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Have you ever planted trees? Have you noticed that it is very hard work? Have you ever lamented the small scale and fragmented nature of revegetation work, and wrung your hands over the continued degradation of rural landscape, ecosystems and communities?

If you live in Sydney, Canberra or Melbourne, you might well pass through the Narrandera area on your way to somewhere boasting sand and surf, rainforest or a decent latte. After all, the Central Riverina is not generally high on the exotic destination list of international jet setting travellers.

The countryside of the Central Riverina area is generally heavily cleared (to around 96%), and supports large-scale industrialised agriculture. Recognised mountainous 'bush islands' in the region have been gazetted (e.g. the Cocoparra Range, The Rock, Galore Hill, Narrandera Range and Brobenah Hills), but there are also large state forests (e.g. Buckingbong SF), and the area still supports many good-quality roadsides. The predominant ecosystems range from grassy yellow box / grey box woodland to river red gum swamp, hilly cypress pine and native grassland communities. Needless to say, grassy box woodlands and native grasslands by virtue of existing on prime agricultural lands are some of the most threatened ecosystems in south-east Australia.

One may become most depressed about issues of salinity, erosion, dieback, ecosystem fragmentation, poor land management and rural social problems in general, whilst doing 100 along the Sturt Highway on the way to somewhere cooler, but upon closer examination there is pioneering work afoot to address these profound issues.

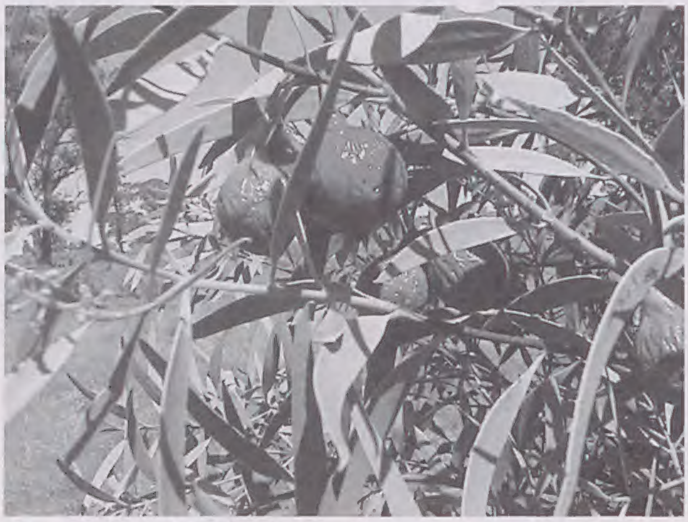


Figure 1. Fruit of the Quandong bush growing at 'Arcadia'. The fruit is edible. Photo Rosie Smith

The predominant stakeholders in the central Riverina are undoubtedly farmers, and most of the region's biodiversity still exists on their properties, often in isolated patches and remnants. An increasingly large number of farmers in the region are learning to love and value their landscape in the context of their temporary custodianship, and are beginning to confront and overcome complex and deep-seated cultural issues to improve the health of their surroundings, gleefully confounding the notion of primary producers as conservative, apathetic and painfully slow on the uptake of change.

'Arcadia' is just such a property, situated approximately 25 kilometres south-east of Narrandera, straddling the suburban belt of Australia's landscape between the Dividing Range and outback. The property is typical of the area, and comprises around 1950 Ha of grazing and cropping land, formerly part of Birrego Station. Run by the Strong family, 'Arcadia' is a stable and profitable agricultural business that is beginning to reap the benefits of viewing farm management holistically, with a firm emphasis on maximising biodiversity.

Since 1996, when the family began collecting and propagating seed from local native plant species growing along roadsides, the operation has now grown to the extent that 80 Ha of farmland has been replanted with native woody vegetation in 2003 alone, under the Department of Infrastructure, Planning and Natural Resources' (formerly DLWC) Environmental Services Scheme. A further 70 Ha has been converted to mixed perennial / native grassland this year, under the same scheme. The ESS aims to encourage permanent, broad-scale, on-farm land use change that will, as the name suggests, provide measurable environmental services to the community by improving water quality, reducing salinity and erosion, protecting and enhancing biodiversity, and enhancing aesthetic and social value.

The farm plantings include around 130 Ha of old man saltbush for sheep grazing (*Atriplex nummularia*), and this included, brings the total native woody vegetation cover on the property up from 2% to around 12% today, with somewhere around 500 000 trees planted!

The ethos of this large-scale landscape change has been fuelled by a pressing need to address all the problems outlined above, but also by attempting to maximise biodiversity across the *whole* property, not by planting five metre tree belts or sugar gums up the drive, and then operating 'business as usual' in the paddock. Biological agriculture and holistic management principles have been enthusiastically adopted, with the view to not just increasing tree cover, but maximizing soil, crop and livestock health. Not surprisingly, the family's emotional health is rapidly improving too, with the term 'regenerative' preferred over 'sustainable' agriculture.

Despite possessing large quantities of motivation, patience and enthusiasm, any Landcare group might find it difficult to replant, monitor and maintain plantings on such a large scale. Direct seeding techniques are used, followed by handplanting of certain species to ensure good multi-storey cover. Local native species are always used, with natives being sourced from further afield only if there is no other alternative.

Direct seeded species on the property (i.e. those planted directly with crop-sowing machinery) typically include golden wattle (*Acacia pycnantha*), streaked wattle (*A. lineata*), boree (*A. pendula*), mallee wattle (*A. montana*), punti bush (*Senna artemisioides*), wedge-leaved hopbush (*Dodonaea cuneata*), deanes wattle (*A. deanei*), kurrajongs (*Brachychiton populneus*), black wattle (*A. hakeoides*), western silver wattle (*A. decora*) and western grey wattle (*A. brachybotrya*). The pioneering short-lived wattles quickly set seed and build up ground litter, whilst the hand-planted species such as grey box (*Eucalyptus microcarpa*), yellow box (*E. melliodora*), river red gum (*E. camaldulensis*), cypress pine (*Callitris columellaris*), needlewood (*Hakea tephrosperma*), bulloak (*Allocasuarina luehmannii*), native blackthorn (*Bursaria spinosa*) and the locally extinct silver banksia (*B. marginata*) can become established.

Many of the hand-planted trees, shrubs and forbs are propagated on-site in a large nursery, with locally uncommon and rare species such as prickly bottlebrush (*Callistemon brachyandrus*), mallee bush peas (*Eutaxia diffusa / microphylla*), butterbush (*Pittosporum phylliraeoides*) and quandong (*Santalum accuminatum*) regularly grown and planted out. The ESS has required large quantities of wallaby (*Danthonia sp.*) and kangaroo grass seedlings to be grown – kangaroo grass (*Themeda triandra*) is now a rare sight on local roadsides. Thorny saltbush (*Rhagodia spinescens*), climbing saltbush (*R. nutans*) and eremophila (*Eremophila debile*) add to the mix, whilst the strategic roadside location of much of the revegetation work encourages colonisation of these areas by existing roadside species, as well as being an effective advertisement for passing drivers.

Deliberately buffering roadsides, creating vegetation corridors, fencing remnants, using sheep as a management tool for weed reduction in plantings and generally farming regeneratively is an ongoing process requiring planning and long-term vision, but the first tentative signs of regeneration are attracting considerable interest from both learned and unconverted parties. The now frequent visitors include University field trips, scientists, conservationists, farmers, naturalists and gardening groups, and the visitors come from ever more diverse groups of society. This educational aspect is growing, bringing with it pipeline projects such as a community seedbank, gourmet saltbush lamb and bushfoods, the latter bolstered by recent success with cultivated quandongs.

The farm is not generally open to the public, but visitors are always welcome. Please phone 02 6959 8656 if you would like to visit.

For further information about other remnant woodlands projects in the Narranderra Range and Brobenah Hills contact NSW National Parks and Wildlife Service, PO Box 1049, Griffith NSW 2680 Phone 02 6966 8121

References

Costermans, L.F. (1996). *Native trees and shrubs of south-eastern Australia*. Lansdowne Publishing Pty Ltd.

Cunningham G.M., Mulham W.E., Milthorpe P.L. & Leigh, J.H. (1992). *Plants of Western New South Wales*. Inkata Press.

Grassy box woodlands CMN website:
www.conservation-management-networks.net/gbw/b.html

Ecological Restoration for Mountain Environments

The Australian Network for Plant Conservation, Australian Alps National Parks and TransGrid will be running a field-based training course titled 'Ecological Restoration for Mountain Environments: Approaches and Techniques' from 28 to 30 April, 2004.

The workshop is aimed at groups undertaking rehabilitation activities in alpine, sub-alpine and montane areas and will visit various sites in NSW and the ACT. A manual to guide rehabilitation activities in mountain environments will be produced following the course.

More information will be available soon on the ANPC website. If you would like to register your interest and make sure you receive the latest information please contact

Laura Vallee laura.vallee@deh.gov.au
Phone: (02) 6250 9509.

AUSTRALIAN ALPS NATIONAL PARKS

Trans

This project has been assisted by the NSW Government through its Environmental Trust

Plants, People and Planning: Integrating national botanical information and regional vegetation planning and management

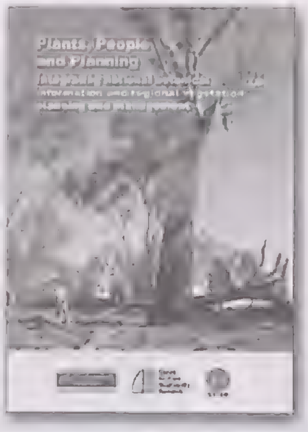
A report prepared for Environment Australia by CSIRO Plant Industry and funded by the Natural Heritage Trust

Gudrun Wells and Andrew Young

Editor's Note: The executive summary for this report is reproduced below with the permission of the authors and the Department of Environment and Heritage. The complete report can be downloaded from http://www.ea.gov.au/land/publications/botanical-information/index.html

Executive Summary

Increasingly, the responsibility for the planning and implementation of native vegetation management, restoration and conservation activities has been devolved to the regional and catchment levels under the National Action Plan for Salinity and Water Quality (NAP) and the Natural Heritage Trust 2 (NHT 2). This has made the accessibility of high quality botanical information to regional end users such as Catchment Management Authorities or Boards, Landcare groups and landholders a priority for the Commonwealth.



The Plants, People and Planning Project has focused on how the information that national botanical databases contain is used in regional vegetation planning and management. This project, which was conducted between March and June 2003, investigated current levels of knowledge about, and application of, botanical information to regional vegetation planning, management and on-ground activities. It looked at the awareness, availability and suitability of data from national databases (for example Australia's Virtual Herbarium, which contains species distribution information, or the Australian Natural Resources Atlas Vegetation and Biodiversity data, which contains ecological information about vegetation types), relative to regional information sources. The specific objectives of this project were to:

1. Examine the accessibility and usefulness of a range of national botanical datasets for regional groups in enabling them to incorporate botanical information into vegetation management planning.

2. Identify processes or fundamental elements that need to be in place to better incorporate botanical knowledge into vegetation management planning, and obstacles to such integration.

3. Provide advice to the Commonwealth on how it can improve access to and use of national botanical datasets for vegetation management planning.

Data were gathered on the accessibility, usefulness and use of national botanical information by a range of regional end users involved in vegetation planning and management in four target catchments in New South Wales and Victoria using a survey questionnaire (123 respondents) and focus group discussions. Groups represented included State agencies, Catchment Management Authorities or Boards, Greening Australia, Landcare and Buschcare Facilitators, Landcare group members and landholders. Additional data on the use of national botanical information in planning were obtained from the examination of published Natural Resource Management (NRM) documents for the four target catchments.

Results show that the majority of end users are primarily focused on planning for biodiversity conservation, but undertake multiple vegetation management tasks (e.g. revegetation and remnant vegetation management), work in a variety of complex landscapes and try to simultaneously achieve a range of vegetation outcomes (eg: waterway protection, salinity control and rare plant conservation). Nearly all identify botanical information as a critical input into their planning and management decision making.

Most end users primarily utilise local and regional sources of botanical information such as maps of current and past vegetation distribution and Ecological Vegetation Classes for their area. In contrast, national data are currently underutilised despite their advantages of data accuracy, reliability, extensive geographical and species coverage and their spatially explicit nature. This is primarily due to difficulty of access.

Key factors determining the usefulness of botanical information sources were accessibility, scale, accuracy and ease of interpretation. The cost of obtaining information

was generally not seen as being a barrier for those associated with management agencies, but was of concern to community users and landholders.

There appeared to be no relationship between end user role, scale of operation, landscape context or management goal and which sources of botanical information were used. This apparent lack of discrimination is probably due to a lack of access to the appropriate data and a limited local capacity to access and interpret the data that is available. Presumably, if information availability and access were ideal, there would be discrimination by end users, who are often knowledgeable about what botanical data they need.

While survey and focus group respondents reported using many primary botanical databases, a review of relevant NRM literature revealed that such databases are generally not referred to. This is true of national-level databases in particular. However, it is likely that these databases are used in background capacity building rather than in producing vegetation plans directly.

Based on these findings, key recommendations to improve the access to, uptake of and effective integration of national-level botanical data into regional vegetation planning and management include:

1. Knowledge Broker: Establishment of a full-time Knowledge Broker position to coordinate and facilitate the distribution of information from a range of national and regional botanical data sources to regional end users.
2. Information Kits: Development of information kits by the Knowledge Broker detailing the availability and utility of national botanical information and its role in complementing and extending currently used regional data.
3. Regional Revegetation Guides: Increased availability of funding for the development of regional revegetation guides, contingent on a) a standardisation of format and context so that resources can be pooled, and b) consultation with the Knowledge Broker to ensure that national data are incorporated where appropriate.
4. Internet Delivery: Development of a website that provides access to all electronic botanical information at the national, state and regional levels. Websites should also be designed to be easily printed and minimise downloading time.
5. National Databases: Continued development of national databases, especially their delivery systems, to ensure that they achieve their goals of national coverage and easy online access.
6. Recording of Botanical Information Sources: Establishment of a requirement for NAP and NHT funded projects to record all sources of botanical information used.

The Jenifer Lewis Herbarium

Gordon E. Limburg

Hornsby Conservation Society Inc

In 1988, Hornsby Council invited Jenifer Lewis to collect specimens of all the native plants in Hornsby Shire for the Council Library. Jenny and her support team set out to search the bushland of the Shire for plant specimens. More than fifteen years later, the mammoth task culminated on 19 August 2003, with a launch of an electronic version of the herbarium, "Hornsby Shire Council's Online Herbarium."

It is the first time a complete collection of all 798 of the known native plants of Hornsby Shire has been assembled.

Dr Tim Entwisle, Director of Plant Sciences at Sydney's Royal Botanic Gardens and Domain Trust, opened the new online herbarium, in front of a large group of people including many eminent biologists, at the Hornsby library. The addition of the Jenifer Lewis Herbarium to existing collections on line is an immense contribution to the scientific world's available knowledge of Australian native plants, in this distinct geographical area.

The audience at the Council Library watched a large screen as breathtakingly lifelike scanned images of live plants and dried specimens were accessed through the internet. These images can now be viewed by anyone who has the necessary equipment, training and time.

As a long-term project of essentially one person, coordinating the work of her support team in their own time, this collection of such superb quality is unique. To anyone who is familiar with the painstaking work of the professional scientists in Sydney's Royal Botanic Gardens, the achievement of this dedicated group of quiet volunteers is incredible.

It is some measure of the demanding work of discovering, identifying, researching, collecting and presenting the Herbarium material, that the hard-working professional information technicians have beavered away for two years to enter images of the assembled specimens on the Council Web site.

With her support team of Ross Doig, Pat Pike and Nöel

Rosten, experts in particular specialities from the Australian Plants Society, Jenny continues to make regular field trips to discover more elusive plants.

Hornsby Shire Council is to be congratulated for its contribution to the project, in providing a home where the Herbarium is available to the public in the Council library, and visible to computer-equipped botanists world-wide.

Jenny worked with technicians to perfect new methods that offer internet images right at the leading edge of modern technology, of both live plants and pressed specimens. This awesome production is the result of more meticulous, concentrated effort than most people perform in an entire lifetime of paid work.

Dried plant specimens are fragile, and for those serious botanists who need to see the real thing, Jenny's superbly presented specimens are available for study at the Hornsby Library.

As a scientifically valid collection of almost every native plant species known in Hornsby Shire, the Jenifer Lewis collection is irreplaceable and has attracted the interest of many botanists from around the world.

The Herbarium can be found at www.hornsby.nsw.gov.au and by following the links to the library, local studies and then Hornsby herbarium.

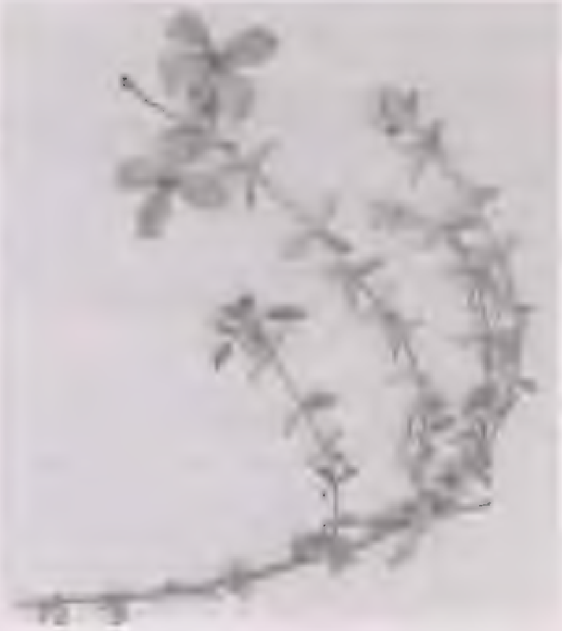


Figure 1. Specimen of Tetratheca thymifolia *as viewed at the online Herbarium*

Orchid conservation: a highlight of celebration in Melbourne

Elizabeth James

Royal Botanic Gardens, Melbourne, Victoria

The Royal Botanic Gardens Melbourne hosted a wonderful week of orchid conservation activities as part of the celebrations for the 150th anniversary of the National Herbarium of Victoria. The week started with a two day workshop on population dynamics run by Prof. Raymond Tremblay from the University of Puerto Rico. Raymond is Chair of the IUCN in situ Conservation Committee of the Orchid Specialist Group and has a passionate commitment to ensuring that research is done in a way that enables robust data analysis to provide a strategy for conservation. He emphasised the value of long-term data sets including all life stages, particularly for plants such as orchids whose presence each year may not always be apparent due to dormancy or difficulty in identification. Participants analysed real data sets and were able to identify stages in the life cycle, which were critical to improving the population sizes of individual species. For some species seedling recruitment was the slow point, for others it was the high percentage of dormant plants in the population. This helps management actions to be tailored to the needs of particular species.

The workshop was followed by the second Orchid Conservation Forum, a three day program of talks, workshops and a fieldtrip designed to update people on the progress made in orchid conservation since the first Orchid Conservation Forum held at the Royal Botanic Gardens Melbourne in 2000. Sixty-five people listened to keynote addresses by Prof. Tremblay, Prof. Ary Hoffmann (Director of the Centre for Stress Adaptation Research in Melbourne), and Dr. Andrew Batty (University of Western Australia & Kings Park and Botanic Garden) and a range of talks and workshops on monitoring, pollination, mycorrhizal associations and *in situ/ex situ* issues.

Prof. Tremblay discussed changes to the way we should think about orchid populations. He put forward the idea that orchid populations may be naturally prone to extinction and recolonisation and that as a consequence we need to not only consider the dynamics of local populations but also the accessibility of unoccupied sites for future colonisation in our conservation management activities.

Prof. Ary Hoffmann discussed the difficulties in relating information about genetic diversity to the ability of a species to adapt to change. For instance, markers that are neutral under particular conditions may become adaptive if conditions change so how do we reconcile theory with realistic conservation goals. Are some rare and declining species lacking in genetic variation so that they lack the ability to adapt? This has been shown to be the case in a native Drosophila species that lacks the genetic variation to adapt to lower humidity levels.

Dr. Andrew Batty gave an overview of integrated orchid conservation using the raft of new technologies in molecular, propagation and restoration sciences using the lady slipper orchid (*Cyrpripedium calceolus*) and the carousel spider orchid (*Caladenia arenicola*) as examples. His challenge to orchid scientists and conservation practitioners is to apply principles established for these species to other orchid species under threat.

A fieldtrip to the Anglesea area finished the week with visits to orchid-rich sites where more than 100 species of terrestrial orchids have been recorded. The trip was a highlight of the week and our thanks are extended to Margaret MacDonald (Angair), Everett Foster (Australasian Native Orchid Society Geelong) and Mike Duncan (Dept of Sustainability and Environment) for their insight into the orchids and ecosystems of the surf coast region.

The abstracts for the Orchid Conservation Forum II are available on the Forum website at http://www.rbg.vic.gov.au/conferences/orchidforum/.

Consequences of Habitat Fragmentation Workshop

Dr. Maurizio Rossetto
Centre for Plant Conservation
Royal Botanic Gardens and Domain Trust

The 'Consequences of Habitat Fragmentation Workshop' was hosted by the Centre for Plant Conservation at the Royal Botanic Gardens and Domain Trust in Sydney. The intention of the meeting was to create a discussion forum for scientists and students researching the genetic and ecological consequences of habitat fragmentation. The programme was divided into four main sessions. Each included a series of presentations and was followed by a period of general discussion during which important research, management and conservation issues were raised.

The first session was titled 'Theory and Methodology' and was set underway by a presentation on Drosophila-based models aimed at assessing the genetic consequences of population fragmentation (R. Frankham, Macquarie University). The best plant reproductive parameters to assay in fragmentation studies were then proposed by Caroline Gross (University of New England), stressing the value in relating such characters to habitat and population quality aspects. The importance of measuring connectivity between fragments was also emphasised, and a number of authors reviewed published work on ecosystem fragmentation and identified strengths and weaknesses of past studies. During the discussion the need for a balance between experimental models and empirical research was highlighted. It was stressed that it is essential to consider how much influence the environmental matrix can have on experimental and comparative studies.

The second session dealt with 'Historical Changes' and focused on the long term effects of fragmentation. Similarities were identified among a variety of species and landscapes that have undergone ancient as well recent fragmentation events. The presentations dealt with a range of organisms including rainforest trees along the east coast of Australia (M. Rossetto, Royal Botanic Gardens, Sydney), bush-rats on offshore islands (P. Baverstock, Southern Cross University) and shrubs from south Western Australia (M. Byrne, Dept. of Conservation and Land Management). The commonality among these examples was in the traceabilityof genetic signals identifying restricted gene flow during ancient fluctuations in environmental conditions. Discussion time emphasised the importance of integrating ecological evolutionary and genetic data, particularly when aiming to identify priorities for conservation and management.

The third session was aimed at presenting and updating a number of recent 'Case Studies'. Andrew Young (CSIRO) reviewed aspects of his research on the consequences of inbreeding within fragmented populations of a rare daisy. A series of presentations on diverse organisms ranging from eucalypts to wood-boring cockroaches followed. In the subsequent discussion it was highlighted how the definition of 'habitat fragmentation' can vary according to the taxonomic unit being studied. This led to the consensus that multi-species approaches are likely to be the most informative. In addition, the need of a greater number of long-term studies producing data accessible to the broader scientific community was debated.

The final session, 'Research and Applications', focused on how the information obtained from habitat fragmentation research can or should be used in ecosystem management.

The session began with Paul Adam (University of New South Wales) reviewing policy and legislative responses to habitat fragmentation. This presentation was followed by a number of studies on fragmentation within the urban context. The meeting was brought to a conclusion by O. Price and B. Rankmore (Dept. of Infrastructure Planning and Environment) introducing the unique case of the Northern Territory, where habitat fragmentation is at its early beginnings. The resulting, discussion was centred on one main question: if habitat fragmentation 'must' occur, what is the best approach for minimising environmental damage?

In addition to the seminars over 20 posters were presented. The workshop provided an invaluable opportunity for debating relevant topics and for developing new ideas and collaborative research. It was proposed that this meeting should become a recurrent event while maintaining its current format, which was considered as particularly successful in stimulating debate. A book of abstracts is available via email from: Maurizio.Rossetto@rbgsyd.nsw.gov.au

Research Roundup

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Shuman, CS. and Ambrose, RF. 2003. **A comparison of remote sensing and ground-based methods for monitoring wetland restoration success.** *Restoration Ecology* 11(3): 325-333.

Williams, PR. Congdon, RA. and Grice, AC. 2003. **Fire-related cues break seed dormancy of six legumes of tropical eucalypt savannas in north-eastern Australia.** *Austral Ecology* 28(5): 507-514.

Publications and Information Resources

Fungi of Australia Volume 2B Catalogue and Bibliography of Australian Fungi 2. Basidiomycota p.p. & Myxomycota

TW May, J Milne, S Shingles and RH Jones.

*CSIRO Publishing/**Australian Biological Resources Study (ABRS) August 2003***

This is an essential reference for taxonomists working on Australian fungi, and anyone who wishes to use up-to-date names of Australian fungi. Together with its companion volume, Fungi of Australia Volume 2A, it lists all the namesapplied to Australian macrofungi and provides the up-to-date accepted name for each species, along with a comprehensive listing of relevant literature

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Australia Burning: fire ecology, policy and management issues

G Cary, D Lindenmayer and S Dovers
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CSIRO Publishing

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Beyond Drought: people, policy and perspective

LC Botterill and M Fisher
October 2003

Avaliable from www.publish.csiro.au, $39.95 paperback

ISBN 0 64306954 2

Orchid Conservation

KW Dixon, SP Kell, RL Barrett and PJ Cribb
September 2003
Natural History Publications

This book is a product of the First International Orchid Conservation Conference held in Perth in September 2001 by the IUCN's Species Survival Commission's Orchid Specialist group and Kings Park Botanic Garden, Perth.

Covers both off site and on site integrated approaches to conservation of orchids including molecular approaches. Essential reading for legislators through to growers and enthusiasts

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Electronic Addresses

20 Environmental Weeds Outlawed

Queensland's Land Protection Act has prohibited the sale of 20 environmental weeds.

www.nrm.qld.gov.au/factsheets/pdf/pest/PP1.pdf

A Prototype Toolkit for Scoring the Biodiversity Benefits of Land Use Change

The toolkit is a product of collaboration between key government departments and stakeholders in NSW and Victoria to assist landowners in assessing biodiversity.

www.dlwc.nsw.gov.au/care/biodiversity_toolkit.pdf

Wetland Care Australia

A recently updated website providing information and wetland rehabilitation and restoration in Australia.

www.wetlandcare.com.au

Illawarra Bioregional Assessment

Contains a report on the NPWS completed bioregional assessment of the Wollongong Local Government Area. In this extensive survey more than 64 threatened species were identified.

www.nationalparks.nsw.gov.au/npws.nsf/Content/Illawarra+Escarpment+and+Coastal+Plain+-+bioregional+assessment

Conferences & Workshops, Courses & Fieldwork

2nd World Botanic Gardens Congress

17 - 22 April 2004, Barcelona, Spain

The congress aims to help quantify the contributions of botanic gardens to the achievement of the Global Strategy for Plant Conservation (GSPC). The programme will cover: implementing plant conservation through botanic gardens, botanic gardens and ecosystem conservation, education and sustainability, botanic garden horticulture and development, botanic garden research, heritage

Further information available from the website www.bcn.es/medciencies/botanicgardens2004 or telephone +44 (0) 20 8332 5953, or Email congress@bgci.org.uk

Translocation of Threatened Plants

17 February 2004, Mount Annan Botanic Garden, NSW

See back cover for more information.

IV Southern Connection Conference Southern Temperate Ecosystems & Biota: contributions towards a global synthesis

19-23 January 2004, University of Cape Town, South Africa

This conference is held every three years and aims to bring together scientists working in the Southern Hemisphere to discuss issues which are unique to this part of the world

Further information can be obtained from:
www.uct.ac.za/conferences/sc2004/index.html

Coast to Coast '04: Australia's national coastal conference

19 - 23 April 2004, Hobart, Tasmania

Conference themes include: adapting to climate change, natural resource management, community participation, tourism and indigenous issues.

Further information is available by Telephone 03 6224 3773, or Email: penny@cdesign.com.au or at the website www.cdesign.com.au/coast2coast2004

Conservation Breaks with Conservation Volunteers Australia

A range of conservation prgrammes are offered throughout the year and around Australia.

Further information available from the Website www.conservationvolunteers.com.au, or Telephone: 1800 032 501 or Email: info@conservationvolunteers.com.au

Recent Techniques in Restoration of Mangroves and Saltmarsh

19 - 20 February 2004, Sydney, NSW

This two day workshop is aimed at people who have some knowledge of mangrove and saltmarsh ecosystems and their management issues. The workshop will explain the method of mapping tidal contours in mangrove and saltmarsh areas and how it can be used as a decision-making tool.

For more information: Bookings Coordinator.
Phone: (02) 9714 7509; Fax: (02) 9714 7559
Email: wetworkshop@sopa.nsw.gov.au

Ecological Restoration for Mountain Environments

28 - 30 April 2004

This workshop will be jointly host by the ANPC, Australian Alps National Parks and TransGrid.

Keep an eye on the ANPC website for more information (www.anbg.gov.au/anpc) or contact the ANPC National Office (details on p. 1) to register your interest.

ANPC Regional Groups

The ANPC has several Regional Groups which play a key role in bringing together those with an interest or involvement in plant conservation to share information through activities organised in their regions. The groups enable efficient communication of best practice information on plant and ecological community conservation to be spread to agencies and groups active in on-ground works. The Regional Groups are coordinated by voluntary coordinators, and activities include seminars and workshops, field days and practical activities such as threatened plant surveys and weeding. Find out where your nearest local group is and join in their activities. If you do not have a regional group nearby, then perhaps you might like to set one up! If so, contact us at National Office and we will be happy to support you.

Melbourne Region (New!): An ANPC member, Bill Richdale, has set up a new Regional Group in the Melbourne area. If you'd like to join please contact Bill on Ph: 03 9440 6291 Email: richdale@optushome.com.au.

Sydney Region: Tracey Armstrong, Mount Annan Botanic Garden. Ph: 02 4634 7939
Email: Tracey_Armstrong@rbgsyd.nsw.gov.au

Illawarra and South Coast NSW Region: Paul Formosa, Wollongong City Council. Ph: 02 4225 2638
Email: pformosa@wollongong.nsw.gov.au
Roger Hart, Booderee Botanic Garden, Jervis Bay. Ph: 02 4442 1122 Email: roger.hart@ea.gov.au
NSW South West Slopes: Paul Scannell, Albury Botanic Gardens. Ph. 02 6023 8769
Email: pscannell@alburycity.nsw.gov.au

Tasmania: Andrew Smith, Parks and Wildlife Service Tasmania. Ph: 03 6233 2836
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Australian Network for Plant Conservation
presents a workshop on

THE TRANSLOCATION OF THREATENED PLANTS

Tuesday 17th February 2004

Venue: Bottlebrush classroom, Mount Annan Botanic Garden, Mount Annan, New South Wales

Have you been involved in, or would you like to be involved in, the planning, approval or implementation of a translocation project for threatened flora? Then this workshop is relevant to you!

Questions to be addressed include:

- What is translocation?
- When is it appropriate to use translocation as a tool to conserve threatened species?
- What needs to be done when planning a translocation program?
- How should a translocation program be implemented?
- What ongoing management and evaluation is required?
- Where can I go for more information?

The workshop will include case studies of translocation programs, highlighting lessons to be learnt. Participants will also be given the opportunity to provide input into the current revision of the ANPC's guidelines for the translocation of threatened plants.

Translocation is one of the many tools available to assist in conserving threatened plant species. It involves the deliberate transfer of plants or regenerative plant material from one place to another. Translocation can be used to enhance existing populations; reintroduce a species to a site where it formerly occurred, but where it is now extinct; and to introduce a species to a site where it hasn't been recorded previously.

Botanic Gardens Trust
SYDNEY

Registrations due by Friday 30th January 2004
ANPC members $45
Non-members $55

This Project has been assisted by the New South Wales Government through its Environmental Trust

Environmental TRUST

Registrations open now - see form inside

Australasian Plant Conservation
BULLETIN OF THE AUSTRALIAN NETWORK FOR PLANT CONSERVATION

For further information contact:
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GPO Box 1777
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Fax: + 61 2 6250 9528
Email: anpc@deh.gov.au
Website: http://www.anbg.gov.au/anpc